No Further Action Decision Document
Oregon Air National Guard, Kingsley Field
Klamath County, Oregon
Project Manager: Cliff Walkey
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ECSI Number: 4551

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Responsible Party: Oregon Air National Guard

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Overview

Oregon Air National Guard (ANG) historically used Environmental Restoration Program Site 11 as an alert facility (see Figure 1 and Figure 6-1). Structures on the property include Building 400/404 and Alert Security and Crew Quarters. Site 11 contains approximately 27.44 acres (Exhibit A). This report recommends a No Further Action (NFA) finding for environmental conditions related to residual low level petroleum contamination in Site 11 soil and groundwater, which is considered protective based upon evaluation of all appropriate exposure scenarios. The recommended action was selected in accordance with Oregon Administrative Rules (OAR) Chapter 340, Division 122, and Sections 0070 to 0110 in accordance with Oregon Revised Statutes (ORS) 465.200 through 465.455.

The recommended action is based on information documented in the administrative record specific to Site 11. A Site 11-specific administrative record index is presented at the end of this report. This index lists principal documents that contain information specifically relevant to Site 11, although the cited documents may also contain information pursuant to other ANG site investigations located at Kingsley Field. This staff report specifically summarizes the more detailed information contained in the administrative file for Environmental Restoration Program (ERP) Site 11 (ECSI 4551). ANG and the Department of Environmental Quality (DEQ) completed a Defense-State Memorandum of Agreement (DSMOA) on June 30, 2004.

Site History

Site 11 was utilized by ANG in the modern era for alert response related to the 114 Fighter Wing, and later, the 173rd Fighter Wing missions (Figure 2-2). The site was historically and is currently located within a security/munitions buffer area associated with the Building 400 Alert Hanger. A record search conducted in 1981 (CH2M Hill, 1982) reported that in 1977 as much as 10,000 gallons of diesel heating oil were released from a ruptured underground fuel line. Subsequent investigations have since identified additional petroleum products in the subsurface at Site 11. Environmental conditions at Site 11 were investigated comprehensively during 1990-1992; 1998-1999; 2001-2003; and, 2006.

Environmental Site Investigation – 1990-1992

The 1990-1992 site investigations included electro-magnetic (EM) survey, direct-push groundwater sampling, soil sampling, and groundwater monitoring well installation and sampling. Results indicated that groundwater on either side of an abandoned heating fuel line was contaminated up to an extent of a 100 foot radius. In response, a groundwater monitoring well network were installed (3 downgradient and 1 upgradient) to assess the lateral extent of hydrocarbons.

Environmental Site Investigation – 1998-1999

During this period several investigations were conducted to assess the extent of hydrocarbons in site soil and groundwater. During June and July 1998, 15 direct-push probe work was completed, which included 15 soil samples and 74 groundwater grab samples on a grid pattern. Initial results indicated that impacts were limited in the vadose zone, but more significant in groundwater. As a result, 6 additional monitoring wells (MW11-4 through MW11-9) were installed during August 1998 and another monitoring well (MW11-10) was installed during October/November 1998. Based upon this more extensive dataset, several distinct petroleum hydrocarbon mixtures were identified in Site 11 groundwater. However, the predominant contaminant was determined to be fuel oil, which was associated with a former fuel pipeline.

Environmental Site Investigation – 2001-2003

Between the 1998-1999 site investigation and 2001, 4 additional monitoring wells (MW11-11 through MW11-14) were installed at Site 11 to delineate the extent of contamination around MW11-8. Oxygen Release Compound (ORC) injections were conducted during two separate timeframes in July/August 2001 and July 2002. Baseline groundwater monitoring from 14 monitoring wells and piezometers occurred prior to ORC injection. Between July and August 2001, approximately 1,900 pounds of ORC was injected (as slurry) into the area adjacent to MW11-8. An additional 2,000 pounds (as slurry) was injected during July 2002. Post-injection groundwater monitoring was conducted for 3 months following each ORC injection. Quarterly groundwater sampling was conducted in selected wells between October 2002 and July 2003. There was an observed decline in benzene concentrations at MW11-8 following ORC injection; however, variability in benzene values was tentatively attributed to seasonal water table changes.

Environmental Site Investigation - 2006

Three data gaps were identified (Table 6-3) that established the scope of field work during 2006. As a result, 2006 field work included:

- Excavation of a test pit, and soil sampling;
- Inspection of the monitoring well network;
- Establishment of surface water gaging stations;
- Measurement of water levels; and,
- Collection of groundwater quality samples for field and laboratory analysis.

Evaluation of results from 2006 field investigations at Site 11 indicated that existing data gaps were successfully addressed. Continued presence of petroleum hydrocarbons in site groundwater exceeded screening level standards in 3 monitoring wells (MW11-8, MW11-4, and MW11-5).

Conceptual Site Model

A Conceptual Site Model (CSM) identifies all of the suspected or potential sources of contamination at a specific site, and summarizes where it is located, how it is likely to move, and who is likely to be affected. At Site 11, the CSM identified the following applicable exposure scenarios (Figure 3):

Soil

- Soil Ingestion, Dermal Contact and Inhalation – Occupational, Construction Worker, Excavation Worker, Hypothetical Residential Receptor.

Groundwater

- Groundwater in Excavation – Construction & Excavation Worker.

Risk-Based Evaluation

Human Health

Concentrations of penta detected in soil samples were compared to generic risk-based concentrations (RBCs) listed in DEQ's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (RBDM) guidance dated September 22, 2003 for the pathway and receptors listed above.

Noncancer and Excess Lifetime Cancer Rate (ELCR) estimates for the exposure scenarios evaluated at Site 11 are summarized in Table 15. Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE) Hazard Index (HI) estimates for noncancer effects are below the regulatory threshold value of 1.0 for all exposure scenarios. In addition, the RME and CTE ELCR estimates from all carcinogenic Contaminants-of-Potential-Concern (COPCs) at Site 11 are below the DEQ regulatory target risk limit of 1E-05 for cumulative risk for all applicable exposure scenarios. The chemical-specific risk estimate for arsenic is slightly above the

acceptable target of 1E-06 for individual carcinogens under the residential scenario. However, the arsenic Exposure Point Concentration[1] (EPC) was 2.5 mg/kg; whereas, the maximum site background arsenic concentration is 5.1 mg/kg. Therefore, the computed risk associated with arsenic is reasonably interpreted to be associated with ambient levels for the site. As such, no Contaminants-of-Concern (COCs) are identified for Site 11 soils.

All maximum detections for VOCs in soil and groundwater at Site 11 are well below DEQ RBCs for indoor air screening (Table 16), with the exception of gasoline range hydrocarbons (GRO). GRO with a maximum detected concentration (355 mg/kg) exceeds the residential vapor intrusion RBC (140 mg/kg) by a factor of 2.5. However, GRO was only detected in 1 of 21 samples at Site 11 and the EPC is 70 mg/kg, which is below the RBC. Therefore, GRO is not retained as a COC.

The maximum lead concentration in soil (39 mg/kg) is below the screening level of 400 mg/kg. In addition, none of the TPH EPCs at Site 11 exceeded the screening RBC values for direct contact as provided in DEQ guidance (Table 13).

Ecological Risk

Level 1 Scoping Assessment identified potentially complete ecological exposure pathways prompting a Level 2 Screening Assessment to determine whether site-related constituents could pose unacceptable risks to ecologic receptors, especially wildlife. The candidate assessment endpoints and corresponding measures of exposure and effect for Site 11 is summarized in Table 17.

Table 24 illustrates groundwater Contaminant-of-Interest (COI) concentrations compared to DEQ Screening Level Values (SLVs) and ambient metals concentrations. Downgradient perimeter wells (MW11-10, MW11-11, MW11-14, and P11-1) monitoring results were evaluated during the time period 1999 through 2006, and SLVs were exceeded for bis(2-ethylhexyl)phthalate, copper, and GRO. However, these screening level exceedances are not considered significant in consideration that:

- Bis(2-ethylhexyl)phthalate was detected very near the detection limit during 1999; the detection could reasonably be associated with laboratory-induced contamination; and, this compound has not been detected during the last two sampling events;
- Copper exceedance was a artifact of a very high detection limit associated with the 1999 event, but has not been observed above either the SLV or background levels during the last two sampling events;
- GRO exceedances only occurred in 1999; they may be associated with high detection limits; and, no exceedance has been observed since 1999.

Land and Water Beneficial Use

[1] EPC is defined in this memorandum as equivalent to 90% Upper Confidence Level (UCL) of data used to support risk computation.

In the 2005 development plan for the municipal airport, the City of Klamath Falls describes a scenario where the Alert Hangar is removed and several private airplane hangers are constructed on the land surrounding Site 11. More recently, the DEQ has been notified that a lease modification package has been prepared and is en-route to the Real Estate group within the Office of the Secretary of the Air Force. Following this review, it will be directed to the Army Corps of Engineers to modify the existing lease. The result of these actions will be that Site 11 is rescinded to the City of Klamath Falls, who can then take steps to implement their master plan for the municipal airport.

Water used at Kingsley Field is supplied by the City of Klamath Falls and is obtained from groundwater production wells (Conger well field). This network of water supply wells is located approximately 4 miles northwest and upgradient of Kingsley Field and produce from deep hydrostratigraphic intervals. A water well survey was completed for all known wells within a 0.5 mile radius of Kingsley Field by querying Oregon Water Resources Department (OWRD) databases identified a total of 43 wells, none of which are located within the Site 11 Locality-of-Facility (LOF)[2].

Conclusions

Site 11 screening risk evaluation demonstrates that there are no statutory exceedances of appropriate DEQ RBCs or SLV standards for environmental media of concern[3]. Site data are considered sufficient for supporting remedial action decisions for Site 11. For human health, the chemical specific risk estimate for arsenic was slightly above a regulatory target of 1E-06 under a hypothetical residential scenario. However, this apparent exceedance is not considered to be of concern because: 1] the (hypothetical) residential scenario is considered unlikely given current and reasonably likely future land use (industrial); and, 2] the arsenic EPC (2.5 mg/kg) is within the range of values considered ambient (up to 5.1 mg/kg). For ecological risk assessment, apparent exceedances of non-toxic SLV standards are discounted based upon belief they are reasonably associated with high detection limit occurring in 1999, but were not observed after that date.

DEQ has been informed that Site 11 is scheduled to be "rescinded" to the City of Klamath Falls (Strauss email dated 5/30/07). The existing lease between Air National Guard and the City of Klamath Falls would be modified in a process anticipated to take between 6 and 10 months to complete. As such, the reasonably likely future use of Site 11 is expected to be redeveloped into industrial aviation use pursuant to the City of Klamath Falls Kingsley Field master plan. Given that no COIs were retained as COCs based upon screening level risk evaluation, there is no identified unacceptable risk to either human or ecological receptors. Site 11 is therefore eligible to receive an unqualified No Further Action determination.

Recommendation

[2] LOF is defined in Oregon Administrative Rule (OAR) 340-122-115 as: "any point where a human or an ecological receptor contacts or is reasonably likely to come into contact with, facility-related hazardous substances...". The extent of residual contamination in groundwater at Site 11 is stable and/or diminishing both spatially and by magnitude of residual contaminant concentrations.

[3] There were some apparent screening levels exceedances – the significance of which is qualified under Risk Based Evaluation and Conclusions narratives in this memorandum.

I recommend that DEQ proceed with a Public Opportunity to Comment during July 2007. Contingent upon any comments received during the formal comment period, I recommend that a No Further Action decision be issued for Site 11.

Attachments[4]

Exhibit A - Legal Description of: Rescind to the City of Klamath Falls, 1/08/07; Exhibit Map for Portion of Tract A-100-2, January 8, 2007
Figure 1 – Facility-Scale Location Map, Kingsley Field
Figure 3 – Conceptual Site Model for Human Health and Ecological Risk Assessment
Figure 6-1 – Site 11 Sample Locations, 1992-1992 Site Investigation
Table 6-3 – Kingsley Field Interim RA Operation Data Gaps for Site 11
Table 13 – Comparison of Soil TPH Concentrations with DEQ Soil RBCs for Direct Contact Pathways
Table 15 – Soil Risk Summary
Table 16 – Comparison of ERP Site 11 Maximum Groundwater and Subsurface Soil Concentrations with Vapor Intrusion RBCs
Table 17 – Ecological Endpoints
Table 24 – Screening for Groundwater Concentrations in Site 11 Perimeter Wells with Level 2 Screening Level Values for Surface Water

Administrative Record

1] Installation Restoration Program Records Search for Kingsley Field Oregon, CH2M Hill, February, 1982.

2] HAZWRAP (Hazardous Waste Remedial Actions Program) Final Kingsley Field Site Investigation Report, April, 1994.

3] Final Technical Memorandum for Site 11: 114th Fighter Squadron, Oregon Air National Guard, Kingsley Field, Klamath Falls, Oregon, ERM, July, 1999.

4] Summary Memorandum: Enhanced Monitored Natural Attenuation for IRP Site 11, Harding ESE, October, 2001.

5] Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, DEQ, September, 2003.

6] Second Annual Groundwater Monitoring Report, IRP Site 11, MACTEC, March, 2004.

7] Final Remedial Process Optimization Site Visit Report: 173rd Fighter Wing, Oregon Air National Guard, Klamath Falls, Oregon, BB&E, July, 2005.

[4] In order of citation in text

8] Environmental Restoration Program Final Interim Remedial Action Operation/Long-Term Monitoring Report, Volumes 1 & 2, CH2M Hill, Inc., January, 2007.

9] Environmental Restoration Program Final Interim Remedial Action Operation/Long-Term Monitoring Human Health and Ecological Risk Assessment, CH2M Hill, Inc., May, 2007.